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Joint Workshop on
LNG Access Issues & Deliverability of Supply

The LNG Challenge – Actions Required to Avoid a Repetition of The California Energy Crisis of 2000

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California's Dilemma

- Huge problem faces State:
  1. Urgent need to expand natural gas supplies available to California in future years
  2. Failure to due so could lead to:
     - Steep increases in prices for electricity & natural gas
     - In some years, potential supply shortages in both markets
- Failure to expand supplies could have crippling impact on State's economy + future ability to fund State budget
  - California potentially = most vulnerable U.S. state
  - 2nd largest natural gas user but unlike Texas (i.e., largest user) at wrong end of the pipe
- Increased imports of LNG potentially = part of solution
- **BUT** – potentially high cost, very high risk strategy
- Could create ingredients for repetition of 2000 crisis

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Significant Risk Factors & Costs

- Permitting & constructing terminals won't guarantee success
- Major risk factors & potential costs of relying upon LNG to meet future energy needs include:

1. **Lack of adequate supplies on the world market.** Significant risk that not enough new LNG supply projects will be undertaken to meet expected needs of U.S. and California markets, especially during critical period between now and 2010 or 2012 when other supply alternative limited.
2. **Delays in project start-up & completion.** Even when needed projects go forward, not likely to be completed within the target dates currently being discussed (= "soft target" dates only – ***not*** firm binding commercial dates). Likely to create major gaps in expected California and U.S. supplies of natural gas in 2008 -2012 time frame.
3. **Potential California purchasers will be outbid for available supplies.** Further, even when needed projects are undertaken, California is likely to be outbid by China, India, Japan, Korea or other purchasers for some or all of the limited supplies likely to be made available on a firm long-term committed basis.

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Significant Risk Factors & Costs (Contd.)

- Major risk factors & costs (contd.):

4. **Potential supply interruptions due to strikes, political unrest, equipment failures or delays in shipping**. Even when suppliers are willing to enter into firm long-term commitments, LNG shipments are inherently subject to interruption due to any of a variety of causes.

   Because of the size of a typical LNG project, any interruption could have a major adverse impact on prices for electricity and natural gas in the California market, even if it is relatively brief. (By contrast, loss of production from a single domestic well almost always is too small to materially affect the market.)

4. **Reliance on spot market purchases would create a level of price volatility and risk that has never previously existed in the California market.** Cargoes delivered into the U.S. on a spot market basis by definition can be diverted to other countries with LNG delivery terminals on very short notice – and presumably will be whenever higher prices can be obtained in any other market in the world. This inherently creates a degree of price volatility and risk that never previously has existed in the electricity and natural gas markets -- ***since it creates the potential for a significant portion of California's expected energy supply literally to disappear overnight***.

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Significant Risk Factors & Costs (Contd.)

- Major risk factors & costs (contd.):

6. **<u>Oil-equivalency pricing</u>**. It also now appears increasingly likely that LNG delivered into the U.S. market often will be priced on a basis similar to oil or in some instances potentially at ***the higher of*** market clearing price for oil or the price for natural gas. This may reduce significantly the potential attractiveness of importing LNG into the U.S. market.
7. **<u>Chilling effect on new development projects in North America</u>.** At the same time, even though the future attractiveness and availability of LNG remains uncertain, the perceived ***potential*** that LNG might "flood" the U.S. market has become a powerful factor deterring many U.S. and Canadian developers from undertaking new exploration & development projects with an extended lead time for completion.

   This in turn threatens to create the "worst of both worlds," in which U.S. production may start to rapidly decline due to a lack of adequate investment in new development, leaving natural gas and electricity purchasers in California with no alternative other than to pay high prices for LNG, as the only available source of supply in a chronically undersupplied market.

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Significant Risk Factors & Costs (Contd.)

- Major risk factors and costs (contd.):
  8. **Potential huge adverse impact on U.S. balance of payments deficit + significant loss of U.S.jobs**. By 2020, in BTU equivalent terms, U.S. LNG imports are expected to exceed current oil imports from Middle East. This could add significantly to the current U.S. balance of payments deficit (already at record levels) and further weaken the purchasing power of the U.S. dollar.
  9. **Potential national security risks**.
  10. **Potential market power of "pivotal suppliers."** As "pivotal suppliers" with the ability to redirect supplies to delivery terminals anywhere else in the world, the super-majors and/or other marketers controlling marketing rights to LNG potentially will have the ability to exercise tremendous pricing power in California and U.S. natural gas and electricity markets.
  11. **Greatly heightened price risks**. Except to the extent that LNG supplies are tied up under firm, long-term contracts, the end result of an LNG-based strategy for meeting California's future energy needs may be to expose the natural gas market and the wholesale market for electricity in California to a greatly heightened risk of severe price spikes or, alternatively, the potential need to institute rolling black-outs whenever LNG normally delivered to California or other U.S. delivery terminals is diverted to other countries.

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Required Solution

- To keep risks within acceptable limits will require a well thought-out action plan by Governor + state regulators
- Required actions fall into four broad categories:
  1. Need to achieve certainty within shortest feasible time frame regarding amounts of LNG that California can depend upon as part of its energy supply plan each year during next 7 to 10 years.
     - Uncertainty re timing and amounts is causing huge harm to California by deterring needed development of alternative sources of supply
  2. Need to establish specific terms and conditions for importing LNG that reduce potential exposure of California's natural gas and electricity customers to extreme price spikes & disruptions in supply.
     - Perhaps the most difficult challenge facing regulators

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Required Solution (Contd.)

3. In parallel, need to take additional action to reduce dependence upon natural gas & lock in domestic supplies
   - Urgency of emerging natural gas supply crisis, potential adverse impacts on California economy (as most vulnerable U.S. state) continue to be severely underestimated
   - Efforts to promote renewable energy & conservation, while commendable, only partially address likely deficit
   - Also need to:
     i. Seriously consider development of nuclear & clean coal
     ii. Consider immediately entering into long-term natural gas procurement contracts to maximize future California supplies
4. Finally, Governor should urge national leaders to act more aggressively to reduce dependence upon imported oil
   - Continuing increases in demand for oil likely to cause continued upward pressure on price of natural gas & electricity, erode value of dollar and increase effective cost of imported LNG

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Specific Terms & Conditions For LNG Imports

- LNG potentially can play an important role in meeting California's future energy needs when:
  1. It is obtained from reliable suppliers pursuant to firm, long-term commitments;
  2. At prices that are competitive with the expected long-term price of natural gas and ***not*** indexed to the price of oil;
  3. With guaranteed, commercially binding commitment dates for the commencement of deliveries; ***and***
  4. Requirements for suppliers to provide substitute sources of supply whenever supply interruptions occur.
- If one or more of these conditions is ***not*** met, reliance upon imports of LNG = ***VERY*** high risk strategy
- May achieve short-term savings, but high risk ultimately will result in periodic explosive increases in natural gas & electricity prices that far outweigh benefits
  - Would create conditions that could result in repeat of 2000 crisis

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Terms & Conditions for LNG Imports (Contd.)

- In addition, California should consider requiring suppliers to:
  1. Help pay for cost of building new natural gas storage facilities and filling these facilities with natural gas to create additional reserves to offset the risk of supply interruptions; and
  2. Reinvest a portion of proceeds from LNG sales in California to partially offset adverse impact on U.S. balance of payments deficit from increased purchases of imported fuels
- Risks of relying on spot market purchases of LNG greatly underestimated
- During certain time periods, may increase available supplies, reduce market clearing price for natural gas
- ***But –*** can be diverted to other markets at any time
- Resulting price shocks could be staggering – in both natural gas & electricity markets
  - Would State accept a long-term electricity supply plan that relies significantly on spot market purchases from generators on boats that could be sent elsewhere in world at any time? Is dependence on LNG to meet California's future energy needs any different?

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Unique Vulnerability of California Economy To Rising Natural Gas Prices & Continuing Declines in Available Supplies

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State's Economic Health at Risk

- Past 12 months have continued to see far steeper increases in price of oil and natural gas than most forecasters predicted
  - Continues pattern of past several years
- Poses unique risks to California
- 2nd largest natural gas consuming State
  - Largest consumer for residential use
  - Dependent upon gas-fired generation for more than 50 % of electricity generated within the State
  - Natural gas also = essential source of fuel and feedstock for manufacturers and agricultural producers in State
- Few if any ways to significantly reduce exposure to price shocks short-term
- Further price increases and/or supply disruptions could quickly send California economy back into a recession and create a new fiscal crisis for State government

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Risk of More Extreme Future Price Dislocations

- Recent price increases for both oil and natural gas could prove to be just "tip of the iceberg"
  - Potentially single greatest threat to health of State's economy
- Growing indications global oil production will not be able to keep pace with increases in global demand
- During past 12-15 months, exceptionally mild weather in eastern 2/3rd's of U.S. reduced natural gas consumption by at least 650 BCf, net of production lost due to Hurricane Ivan
  - Spring of 2004 = 3rd mildest in 110 years
  - Followed by 2nd mildest summer in past 30 years, far milder-than-normal fall and warmer-than-normal winter
- Power sector demand for natural gas nationally continuing to increase at rate of at least 450 BCf/yr each year
- Natural gas supplies available to U.S. market static at best
- As soon as temperatures return to historical norms, natural gas prices certain to increase

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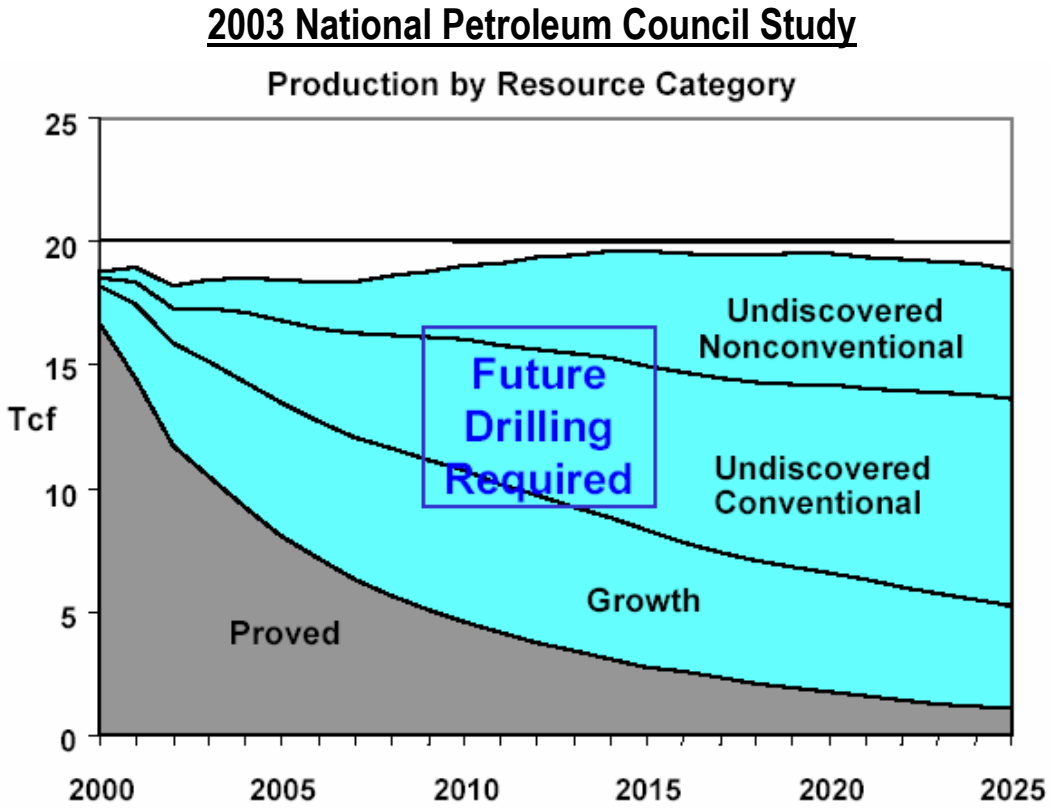
Risk of Continued Deterioration In Domestic Natural Gas Production

- Also quite possible – perhaps even likely – that future U.S. and Canadian natural gas production will fall well below levels assumed in almost every price forecast
- Assumptions used in most forecasts closer to a "best case" scenario than "most likely" outcome
- Reflect production levels that appear possible in theory based upon paper studies that generally assume:
  i. No significant increase in decline rate from existing fields
  ii. Aggressive efforts by U.S. and Canadian developers to find and develop new fields
- Requires almost ½ of total U.S. production before the end of this decade to come from fields that have not yet been discovered
- Even then, North American supply expected to fall far short of expected increases in North American demand

Risk of Continued Deterioration (Contd.)

- Findings of National Petroleum Council's (NPC's) 2003 Study illustrate importance of aggressive expenditures on new development:



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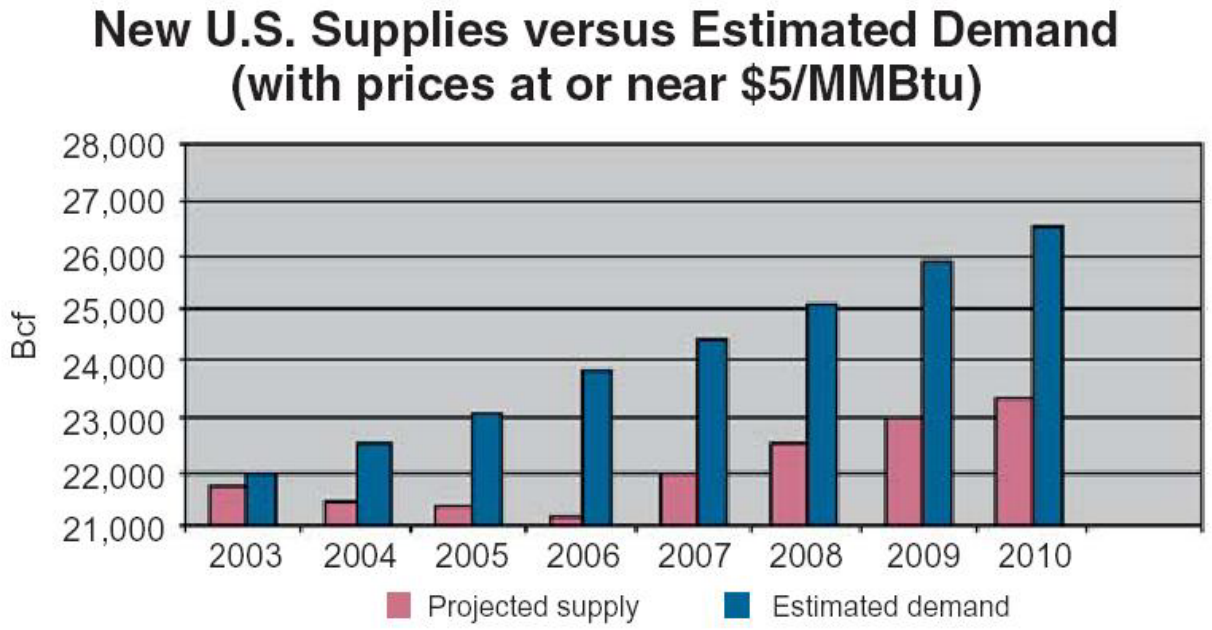
Risk of Continued Deterioration (Contd.)

- For past several years, rate of investment in exploratory drilling has been far below required levels
- U.S. and Canadian natural gas developers have concentrated principally on increasing density of drilling in existing fields
  - Near term, helps to stabilize production
  - But also accelerates date on which many fields will begin to rapidly decline
- Many E&P companies reluctant to devote significant capital to longer-term development projects required to find and develop new fields
  - Untested assumption that LNG imports will "flood" U.S. market has major chilling affect on development
  - Also has been perceived as less expensive & risky to purchase reserves than to acquire through drillbit
- Creates worst of both worlds in which in future years neither LNG nor domestic production likely to be adequate to meet California's needs

Creates Massive Potential Hole in Expected U.S. Energy Supplies

- Even with increased imports of LNG + aggressive action to reduce dependence upon natural gas, likely to create major gap between projected needs and supplies available to U.S. market
  - Energy Information Agency (EIA) estimates severely understate magnitude of potential deficit, potential upward price pressure



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Severe Risks to California

- Risks could be even greater than foregoing analysis suggests
- Over next several years, demand for natural gas at current price levels could grow even more rapidly than expected
  - Both nationally and in western U.S.
- Factors that could contribute to increased demand include:
  - Continued lower western hydro availability than during ’90’s
  - Continued rapid population growth in other western States
  - Hotter-than-normal summers and/or colder-than-normal winters
  - Likely unavailability of Mohave coal-fired unit (one of only 3 coal-fired units currently serving State) at least for a period of time beginning 12/31/05
  - Potential early retirements of nuclear units and/or performance significantly below last year’s exceptional levels
  - Continued pressure to shut down older coal-fired units elsewhere in the U.S. and Canada or convert to natural gas

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Severe Risks (Contd.)

- Cumulatively, these factors could easily increase demand for natural gas nationally by 1 Trillion Cubic Feet or more in any one year
  - If this occurs, it almost certainly will result in steep increases in price of natural gas & electricity in California market
  - Could also result in need to curtail services on some days
- At the same time, supplies of natural gas available to California market from North American sources are likely to come under increasing pressure every year
- Potential sources of additional pressure include:
  - Potential that imports available from Canada will fall off rapidly, especially if Tar Sands development continues to be expanded (potentially increasing Canadian demand) and the MacKenzie Valley project (previously expected to help supply this market) is cancelled or continues to be delayed (as now appears likely to occur) and/or coal-fired units in Ontario are retired and replaced with natural gas (as has recently been announced)
  - Increased competition from Midwest for supplies from the Rockies (in part due to reduction in gas flows from Canada)

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Severe Risks (Contd.)

- Potential sources of pressure (contd.):
  - Potential continued increases in exports to Mexico (reducing net supplies available to the U.S. market)
  - Potential that production will continue to decline more rapidly than expected in the Permian Basin, western Canada and most other U.S. Regions except for the Rockies
- Bottom line: threat of severe price spikes and shortages and California natural gas and electricity markets is very real
  - Most analyzes continue to focus on a "base case" scenario that assumes everything will go right and is likely to prove to be ***far*** too optimistic
  - Considerably more attention needs to be devoted to examining a range of scenarios taking into account factors identified above
- Relatively few steps available to California to alleviate potential pressure on market in very near term (i.e., next 1 to 3 years)
- Creates urgent need to move quickly to put longer-term solutions in place

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Current U.S. Strategy for Meeting Future Natural Gas Requirements Depends Heavily Upon Increased Imports of LNG

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Urgent Need to Assess Appropriate Role for LNG

- Increased LNG imports can – and almost certainly will – play at least some role in helping to overcome the huge natural gas supply gap currently facing U.S. and California markets
- Open issues include:
  1. How much LNG is likely to be available?
  2. In what time frames and under what price terms?
  3. To what extent ***should*** U.S. rely on increased LNG imports to meet its incremental energy requirements?
  4. What terms & conditions should be imposed on LNG imports?
- Remarkably, despite huge stakes, ***none*** of these issues has yet been studies comprehensively by ***any*** agency of federal or state government
  - Just 36 months ago, EIA concluded LNG unlikely to play major role in meeting future U.S. needs (AEO 2002)
  - Energy Commission workshops = important first step in assessing
- Urgent need for California to undertake a comprehensive, in-depth assessment of these issues immediately
  - More at stake for California than for any other State

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Limitations of NPC Study

- The *only* Study conducted nationally to date that has examined the potential impacts of a heavily LNG-dependent strategy in any depth = 2003 Study prepared for Secretary of Energy by National Petroleum Council (NPC)
- NPC Study contains useful information
- Also has major limitations:
  - Much of the work in preparing Study performed by some of the same companies that are seeking to import LNG into U.S.
  - Preparation began in spring of 2002, when oil prices had not yet begun to increase and China and India had not yet entered period of rapid growth
  - Assumes a long-term price for oil of $ 24 per barrel
- Virtually all of the assumptions in Study regarding price and availability of LNG need to be thoroughly reexamined in light of changed conditions since date Report was issued

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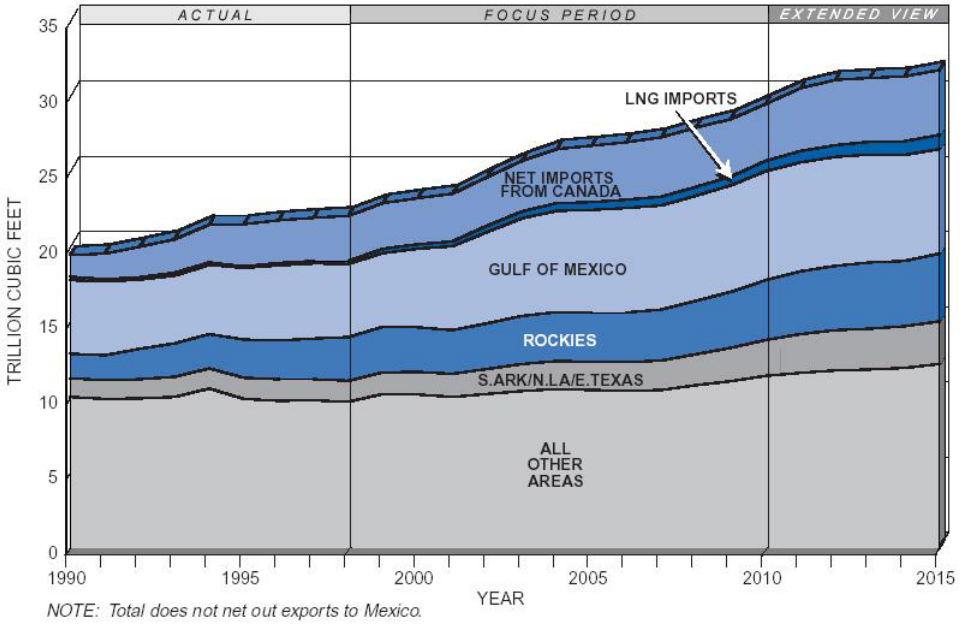
Poor Prior Track Record

- NPC's prior track record also less than stellar
- Last NPC Study, completed in late 1999, predicted that U.S. natural gas supply could be increased to 33.5 TCf by 2015 with no significant increase in natural gas prices
  - Significant factor in subsequent decision to build over 200,000 MW of new gas-fired generation (which has led to current crisis)

U.S. Natural Gas Supply by Source



NOTE: Total does not net out exports to Mexico.

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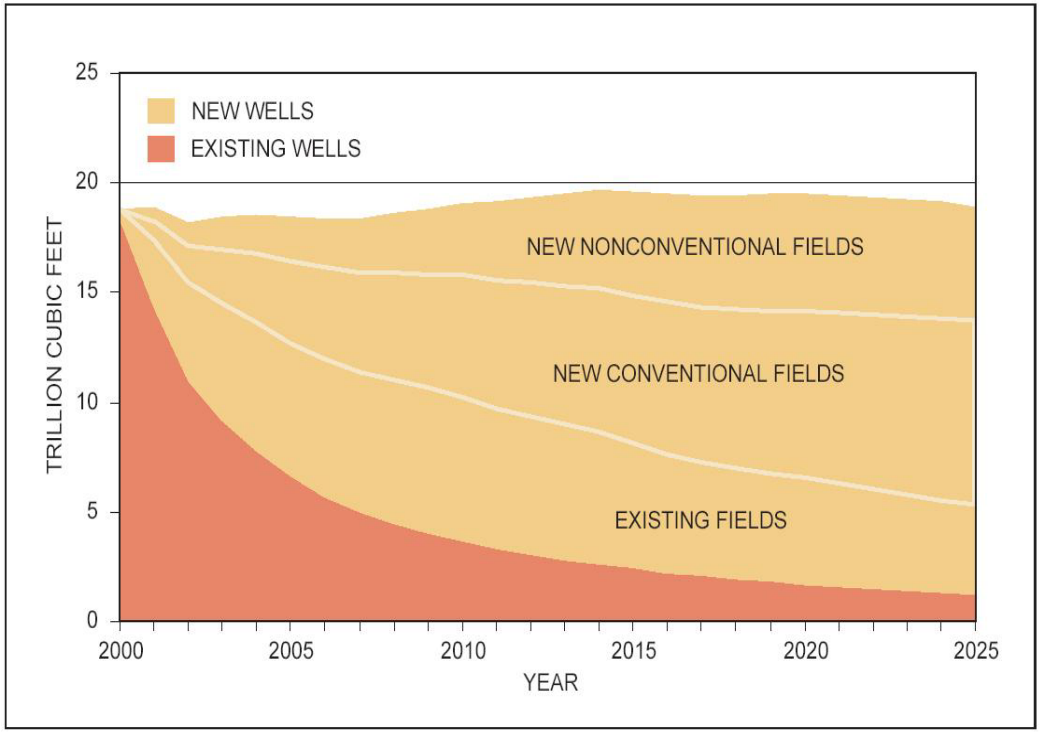
Huge Void

- 2003 NPC Study, issued just 45 months later, reduces estimated 2025 production by a staggering 16 BCf/day (6.0 TCf/yr)
  - In BTU equivalent terms, creates a void in expected U.S. energy supply = 1 ½ X current oil imports from Middle East



Lower-48 Production, Existing and Future Wells

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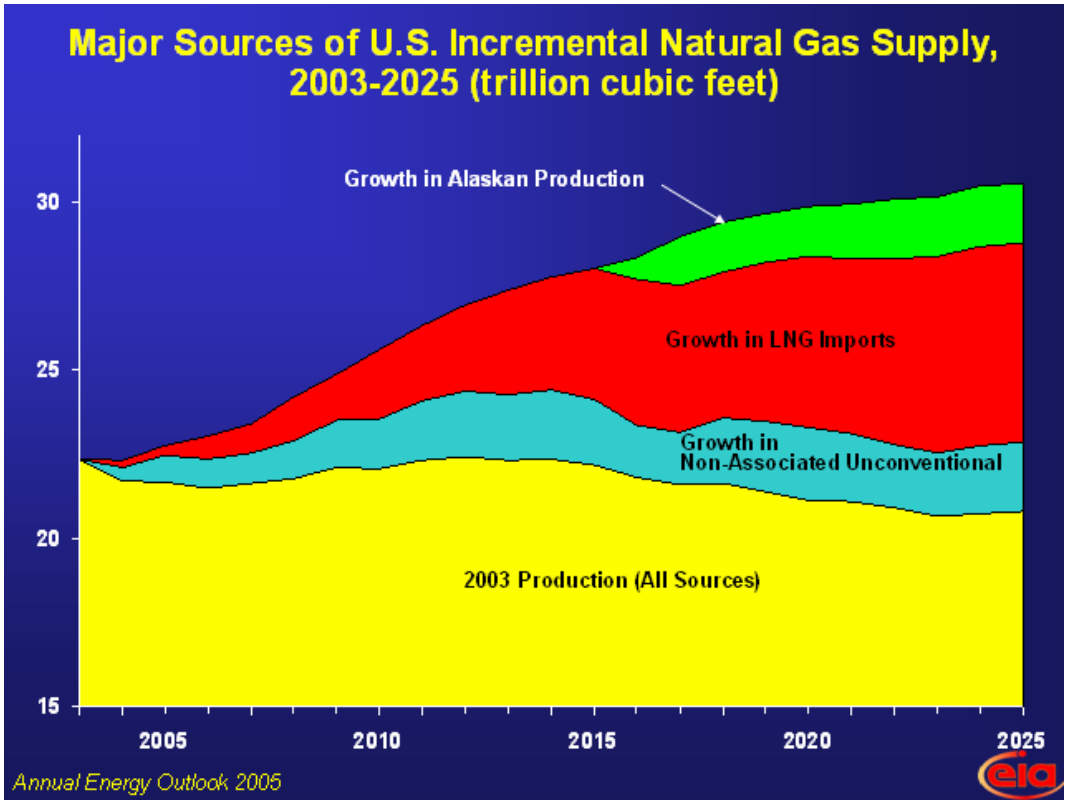
Fundamental Shift in U.S. Energy Strategy

- Based in part on momentum created by 2003 NPC Study, EIA forecasts now assume increased LNG imports = primary source for meeting incremental U.S. natural gas requirements for next 20 years
  - Fundamental shift in U.S. energy strategy during past 36 months
  - Occurred with virtually no analysis or public debate
- Increased LNG imports + natural gas delivered from Alaskan expected to account for 87 % of incremental U.S. gas supply
  - Proposed Alaskan pipeline, however, not expected to enter service, until 2016 or 2017 at the earliest (assuming it goes forward)
  - Even then, targeted principally at Midwest market

Fundamental Shift (Contd.)

- EIA's most recent forecast of sources of future U.S. natural gas supply:



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Sobering Realities

- Despite critical importance of these issues, EIA has ***not*** undertaken any in-depth, independent assessment of how much LNG is likely to be available or likely price
  - Instead, estimates based more on a hope as to what might be available based upon expected U.S. market needs
- Tendency in U.S. is to focus on siting of new terminals
- Terminal siting, however, is not only or even the most important unanswered question
- Instead, important to recognize that:
  1. Many other countries also expect to rely on increased imports of LNG to meet their incremental energy requirements;
  2. Current global LNG market:
     - Still is at a relatively early stage in its development
     - Designed to serve primarily 3 countries (i.e., Japan, South Korea and Taiwan)

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Sobering Realities (Contd.)

- Important to recognize (contd.):
  3. Only a limited amount of new LNG production capacity currently under construction anywhere in the world
  4. Most of the output of from these new projects already committed for delivery to other countries
  5. Despite expectations for significant growth in global demand, few new LNG projects have broken ground anywhere in the world over past 12 to 18 months
  6. While global stranded gas reserves are large, only a small number of countries appear to have large enough reserves to support construction of more than 1 or 2 efficiently-sized new projects
  7. The minimum lead time required to finance a major new LNG projects generally is considered to be at least 48 to 60 months;
  8. To achieve EIA's estimates for future U.S. import levels, beginning by as early as 2008 or 2009, most of the output will need to be obtained from projects that have not yet broken ground

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Sobering Realities (Contd.)

- Considerable uncertainty remains, therefore, regarding how much new capacity will be brought on line (especially over the critical next 5-7 years) and when each new project will go into service
  - Qatar, for example, which is expected to become the largest LNG producer, has recently announced a moratorium of indefinite duration on new projects
  - It remains to be seen at what pace Qatar and other countries will choose to develop their reserves (i.e., potentially over many decades)
  - Further, even those projects which go forward may be delayed several times before they actually go into service
- Further, even when new supplies become available, competition between different countries for the output of these projects is likely to be fierce and the share obtained by U.S. purchasers ultimately may be relatively small
- Especially over next 10 to 15 years, therefore, the output delivered into the U.S. market could turn out to be only a small fraction of the level EIA currently estimates

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Oil-Equivalent Pricing

- Further, pricing and other major terms and conditions under which new supplies of LNG are likely to be made available to U.S. purchasers remain highly uncertain
  - Especially in view of the dislocations that have occurred in the global oil market since the National Petroleum Council issued its 2003 Study and the potential for further dislocations to come
- At this point, little apparent basis for assuming that LNG will continue to be priced on a cost-plus basis (as the NPC assumed in its Study)
- Instead, tendency over past year has been for LNG increasingly to be priced similarly to oil -- especially for spot market sales
- This tendency is not surprising, since LNG historically has been indexed to oil in most markets and competes for many of the same uses
- Not clear why suppliers would accept a lower price

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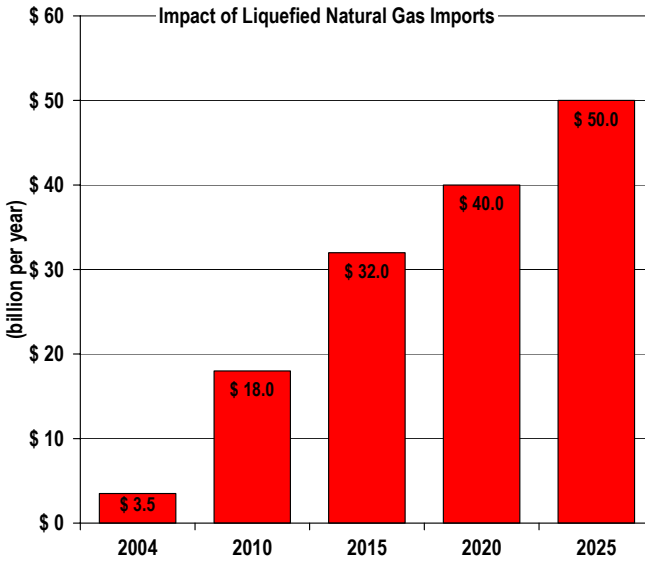
Adverse Impact on Balance of Payments Deficit

- Over time, a heavily LNG-based strategy for meeting future U.S. energy needs would be likely to have a major adverse impact on the U.S. balance of payments deficit (already at record levels):

Potential Increase in Balance of Payments Deficit Due to Increased Imports of LNG



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Spot Market LNG Supplies Inherently Unstable

- Recent trend has been for an increasing percentage of LNG sales to be made on a spot market basis
  - Clear advantage from suppliers' standpoint, since allows supplier to obtain highest price available anywhere in the world
- Not clear what percentage of total output from new projects will be made available to purchasers on a firm, long-term fixed price basis or the potential premium that might be required to lock in supplies on a firm basis
- As noted earlier, in the LNG market, spot market purchases inherently = high risk source of supply
- Reason: fundamental differences between global spot market for LNG and the existing market for spot market purchases and sales from U.S. wells

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Existing U.S. Market Provides No Incentive to Withhold Supplies

- North American producers generally have no reason to withhold production from U.S. market
- This is because, for any producer who has not previously committed output, only options typically are to sell into spot market or not sell at all
- Further, after well has been drilled, costs of production largely sunk
- As a result, U.S. and Canadian producers typically produce at or near maximum capacity -- especially during periods when prices are high
- Natural gas prices are still volatile
- No evidence, however, that price spikes have resulted from available output being withheld from the market

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Permanent Shift in U.S. Market

- During past 12 months, already evidence increased LNG dependence could permanently change U.S. market
- LNG cargoes, by definition, can be shipped anywhere in the world with LNG delivery terminals
- Spot market cargoes therefore can and often will be diverted completely away from the U.S market when higher prices available elsewhere
- Both last summer and at the end of this past winter, a significant number of cargoes originally expected to be delivered into U.S. market instead were shipped to other parts of the world
  - Principally Japanese market last summer (nuclear unavailability)
  - Principally Spain this past winter (poor hydro availability)
- By this past March, impact was to precipitously reduce U.S. LNG imports by 28 % from December levels (i.e., 0.6 BCf/day)
- At one of 4 existing U.S. terminals (Lake Charles), imports shut down almost entirely

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Huge Potential Market Impact

- Potential impacts of these periodic sudden losses of supply should not be underestimated – especially as LNG dependence continues to grow in future years
- Energy markets highly sensitive to small swings in supply/demand balance
- Last fall, loss of production due to Hurricane Ivan (at its peak for a brief period 2.4 BCf/day) caused winter month futures prices to increase by almost 50 % in just 6 weeks
- This past winter, loss of spot market LNG supplies coincided with mild weather and high levels of natural gas in storage
  - Prices still soared during period in which LNG diverted
- In future years, similar problem could arise in a year when U.S. weather had been cold and amounts in storage low
- Could lead to fierce bidding war for LNG as marginal source of supply in global market, with record impact on prices
- Impact on natural gas & electricity prices in California could be just as great as in eastern U.S.

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Plausible "Worst Case" Scenario

- One plausible "worst case" scenario might involve a colder-than-normal winter occurring simultaneously in Canada, the northeast quadrant of the U.S. and northern Europe
- If this scenario occurred 3 or 4 years from now, for example:
  - U.S. winter time consumption could easily increase by 500 BCf to 1 TCf over last winter's levels (if not more);
  - Imports from Canada during the winter months might simultaneously decline by 1-2 BCf/day during the winter months (150 -300 BCf total) due to the need to use more gas in Canada; and
  - Imports of LNG might simultaneously decline by an ***additional*** 2 -3 BCf/day (300 to 450 BCf total) as a result of European government-backed utilities outbidding U.S. purchasers for available spot market cargoes of LNG.
- The net drain on the U.S. market during the winter months, therefore, could easily be as much as 950 BCf to 1.75 BCf
- As result, U.S. underground storage at the end of the winter season effectively could be drawn down to zero

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Plausible "Worst Case" Scenario (Contd.)

- Further, since the U.S., Canadian and European markets are all potentially undersupplied, even with the reduction in Canadian exports and increased LNG flow into Europe, end-of-season storage in both Canada and Europe would be likely to fall substantially below normal levels
- As a result, all during the Refill Season, imports from Canada would be likely to remain below normal levels
- U.S. and European purchasers in all likelihood would end up competing fiercely for any available spot market cargoes of LNG – including those originally expected to be delivered into the California market
- Under this scenario, it would not be the least bit surprising to see the spot market price of natural gas in the California market bid up to $ 15 to 20/MMBTU (if not higher), with corresponding increases in the wholesale market price of electricity
- Even with prices at this level, achieving full storage refill by the end of the injection season might prove to be impossible

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Implications for California

- Given State's current dependency on natural gas, California may have no alternative other than to turn to LNG to meet at least a portion of its future energy needs
- While supply availability in the Pacific market may be somewhat better than in the Atlantic Basin, considerable uncertainty remains regarding how much will be available, when and on what price terms
- At same time, perceived potential that large amounts of LNG is likely to enter the U.S. market – even if exaggerated – is drying up California's alternative sources of supply
- State has a strong interest, therefore, in:
  - Resolving quickly how much LNG actually will be brought into California market
  - Protecting itself against the potential for severe price spikes that inevitably will accompany any LNG strategy that includes even a small spot market component

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Lessons Learned from the California Energy Crisis of 2000

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2000 Crisis

- 2000 crisis resulted in massive increases in the cost for electricity and natural gas that are continuing to affect the State of California to this day
- While the controversy regarding the 2000 crisis may never end, most studies attribute these cost increases primarily to a combination of 3 factors:
  1. Insufficient generating capacity to meet higher-than-anticipated needs
  2. Insufficient supplies of natural gas
     - Tight supplies nationally led to a 4X increase in prices at Henry Hub
     - Even tighter supplies in California, due in part to an explosion that reduced available pipeline carrying capacity into the State
     - Led to even steeper price increases in California market
  3. Price manipulation – allegedly both in the wholesale electricity market (by withholding available generating capacity) and in the natural gas market (by withholding available pipeline capacity needed to deliver gas into the State)

Deeper Lessons

- Implicit in these findings are at least three deeper lessons:
  1. In absence of integrated resource planning requirements, it is not always possible to rely on market forces to ensure adequate supplies of generating capacity or fuel.
  2. Relying on spot market purchases in energy markets can be dangerous, since even small deficiencies in the amount of available generation or fuel delivered into the market can lead to staggering price increases.
  3. Finally, one of the major risk factors that must be guarded against in overseeing energy markets is the potential ability of "pivotal suppliers" to exercise market power – i.e., to unilaterally increase price of electricity or natural gas by arbitrarily withholding a portion of available generating capacity or fuel from the market

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Implications for LNG

- Each of these lessons bears directly on policies California should adopt with regard to LNG
- Specifically, at a minimum, the State should make sure that:
  1. Its policy towards LNG does not at any point increase the risk that supply shortages will develop in the State; and
  2. No LNG supplier becomes a "pivotal supplier" able to exercise market power by withholding needed supplies from the California market.

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Huge Stakes

- Stakes are huge
- 2000 crisis demonstrates that even relatively small deficiencies in the natural gas supplies available to the State, coupled with the unavailability of even a relatively small percentage of the State's generating units (a majority of which need natural gas to operate) under certain circumstances can lead to literally billions of dollars in unexpected costs in just a few months time
  - If allowed to occur again, could negate any potential benefits from allowing importation of LNG into California in a matter of a just a few weeks

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Ensuring Adequate Supplies

- State's most important objective to be to ensure adequate supplies of natural gas ***without interruption*** in supplies huge
- As noted earlier, uncertainty regarding how much LNG will be imported into California and other U.S. states *already* is having an adverse impact on the likely future supplies available to California, but discouraging expenditures on long-term development in the U.S. even though the potential timing and magnitude of future LNG imports is uncertain at best
- This leaves California in the worst of both worlds, where it may wind up with neither source of supply
- Further, spot market supplies of LNG inherently don't satisfy California's objectives, since they can – and in all likelihood frequently will – be diverted to other markets at any time, potentially leading to explosive price increases in the price of natural gas in the U.S., which could have a particularly brutal impact on California, as the most vulnerable U.S. State

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Need for Decisive Action

- It is essential for California to act promptly and decisively to resolve this conundrum, which poses profound risks to the adequacy of the State's future energy supplies
- This perhaps can best be done by:
  1. Conducting a resource planning proceeding to determine immediately how much LNG the State will seek to import each year over the next 10 to 15 years and who will import it;
  2. Immediately after the conclusion of that proceeding, entering into the necessary procurement contracts to lock-in the needed supplies on a long-term, firm fixed price basis;
  3. Either banning outright spot-market imports of LNG, or limiting imports to specified circumstances and specified, limited amounts; and
  4. In parallel, going into the market to enter into firm long-term contracts to purchase a significant portion of the State's remaining natural gas requirements over the next 10 to 15 years.
- Additional steps which should be considered are discussed in slides 6 through 9 above

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Regulation of Pivotal Suppliers

- A ban on "spot market" imports – or strict limitation to certain narrowly defined circumstances – also would alleviate what otherwise will be a serious problem of the potential need to regulate LNG importers as "pivotal suppliers"
- It is quite possible that several U.S. LNG suppliers will *each* control the delivery into the U.S. – or potentially even into the California market – of quantities of natural gas greater than the quantity of natural gas, for example, at issue with respect to the capacity allegedly withheld on the El Paso Pipeline
- As a result, indirectly, in a potentially fuel-constrained market, they may also control the ability to dispatch significant blocks of generation
- Even assuming none of these suppliers ever deliberately withholds shipments from the U.S. market for the purpose of increasing the price of natural gas or electricity in the U.S. market, the ability to ship this LNG to other markets may give these suppliers significant pricing power in the U.S. market
  - I.e., in effect, they may each be "pivotal suppliers" in the U.S. market, just as many California generators and pipelines were in 2000

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Regulation of Pivotal Suppliers (Contd.)

- If these suppliers are only permitted to import LNG into the California market on a firm, long-term fixed priced basis (or, alternatively, enter into binding long-term contracts committing them to do so voluntarily) this may largely negate their ability to exercise market power in either the natural gas market or the generation market
- Absent such restrictions, however, there may be no alternative other than for either California or the Federal Energy Regulatory Commission (FERC) to develop and implement a new set of regulatory requirements to prevent the potential abusive use of market power

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Need for Other Initiatives

- Finally, the likely limitations of LNG just discussed highlight the urgent need for the State to initiate a comprehensive program to address the emerging natural gas crisis
- As discussed previously, California is more vulnerable to natural gas shortages and price shocks than any other State
- It does not yet have adequate programs in place, however, either to reduce its future dependence or maximize its future supplies
- Over the next several years, the impact of reduced natural gas availability on energy costs in the State could well have greater impact on the State's economy than any other single issue
- It is essential, therefore, that California develop and implement a comprehensive program to address this issue, as it impacts both the natural gas market and the electricity market, at the earliest feasible date

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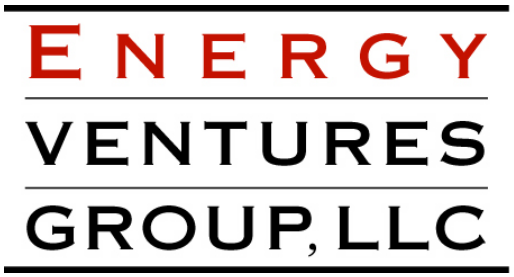
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